

Overview

The HP ProLiant ML350 G5 Storage Server is a powerful Windows-powered file and print tower solution that enables small, medium, and remote office environments to consolidate multiple direct-attached storage (DAS) installations and management interfaces to a single centralized Network Attached Storage (NAS) device. This solution can also be a way to add capacity to your network very quickly, or it can be an effective disk-based backup or replication target. It supports multiple file sharing protocols and Windows storage-specific tools that make file share maintenance both easy and powerful. And with the optional Microsoft® iSCSI Software Target, you can upgrade to host block-based storage for Exchange, SQL or other applications.

This network storage solution not only aids in consolidation, storage expansion, and cost reduction, but also helps you spend less time and effort deploying and managing file and print services. It comes with Microsoft Windows Storage Server 2003 Release 2 Operating System pre-installed, and user storage is pre-configured. It's quick to install and it's Windows through-and-through--if you know how to use the Microsoft Management Console (MMC), you probably already know how to manage it. And the unique Rapid Start-up Wizard streamlines installation even more. Finally, remote management capability at both the system level and at the hardware component level (IPMI v2.0) means you can manage and troubleshoot from anywhere.

The ML350 G5 Storage Server leverages industry-standard components to protect your investment and integrates seamlessly into HP ProLiant or StorageWorks environments. It offers four capacity points and has the flexibility to support either SATA or SAS hard drives; SATA-based models are available with 960Gb, 1.5TB or 3TB of raw capacity and the SAS model is available with 1.8TB of raw capacity.

What Is a Storage Server?

We use the ProLiant Storage Server product name to describe our line of enhanced Windows file and print servers. These Network Attached Storage (NAS) solutions are optimized devices that work over Ethernet networks and provide support for heterogeneous file serving in a high-capacity package. Our solutions also provide specific features to simplify the tasks and reduce the resource burdens associated with data storage and management. NAS technology simplifies file server configuration and manageability, and improves data access to clients and applications by supporting different operating systems and protocols.

What's New

New high performance model with 6 x 300GB Large Form Factor 15K RPM SAS HDDs

- Product Features
- Processor

Memory

  - Dual-Core Intel Xeon 5150 (2.67 GHz/1333 MHz FSB with 4MB L2 cache); support for up to 2 processors
  - 1 GB (2 x 512MB) of PC2-5300 Fully Buffered DIMMs (DDR2-667)
  - Up to 4GB supported

### Overview

#### Operating System

- Windows Storage Server 2003, Release 2 (Standard Edition) pre-installed
  - Windows Storage Server 2003 R2 includes:
  - HP-enhanced File Server Management Console
  - File Server Resource Manager for quotas, file screening and storage reporting
  - Print Server support
    - New print management console
    - Unlimited printer support in Standard Edition
  - Microsoft Services for Network File System (NFS)
  - Distributed File System Replication, including
    - DFS Management Console
    - Configuration and Diagnostic Tools

#### Network Controller

- Unlimited Client Access License (CAL) included
- Embedded NC373i Multifunction Gigabit Network Adapter with TCP/IP Offload Engine
- Supports the Microsoft Windows Server 2003 Scalable Networking Pack, which includes TCP Chimney Offload, Receive-side Scaling (RSS), and NetDMA features.

#### Storage Controller

- Smart Array E200i Controller with 128MB battery-backed write cache (BBWC) included

#### Internal Drive Support and Model Capacities

- Six LFF (3.5") Hot Plug Serial-ATA (SATA) or Serial Attached SCSI (SAS) hard drives
  - 960GB (6 x 160GB SATA)
  - 1.5TB (6 x 250GB SATA)
  - 3TB (6 x 500GB SATA)
  - 1.8TB (6 x 300GB SAS)

#### Expansion Slots

- Six total expansion slots
- One 64-bit/133-MHz PCI-X; two 64-bit/100-MHz PCI-X; three x8 PCI Express (x4 speed)

#### Power Supplies

- 800 Watt CE Mark Compliant 1+1 Redundant Hot Plug Power Supplies (1000 Watt high line)

#### System Fans

- Four dual redundant fans standard (does not include power supply or processor heat sink fans)

#### Remote Management

- Integrated Lights Out 2 (iLO2) with Advanced License Pack standard

#### Form Factor

- 5 U Tower
- Optional rack conversion kit available

#### Warranty

- The HP ProLiant ML350 G5 Storage Server has a standard 3-3-3 warranty (3 years parts exchange, three years labor, and three years on-site, next business day response)

### Software Components

#### Optional Software from HP for Storage Servers

- **Microsoft® iSCSI Software Target** - Powerful iSCSI software target solution that provides affordable application storage provisioning, protection, and availability for small and medium office environments. The software adds block storage capability to ProLiant Storage Servers and creates a single platform that delivers file, print, and application storage services, all over existing Ethernet networks. It helps administrators consolidate storage capacity, improve storage utilization, minimize system downtime, simplify backup operations, enable rapid recovery, and provides high availability for key applications and services.

For more information:

[http://h18006.www1.hp.com/products/storageworks/ms\\_iscsi/index.html](http://h18006.www1.hp.com/products/storageworks/ms_iscsi/index.html)

- **HP StorageWorks Storage Mirroring Software** - HP StorageWorks Storage Mirroring offers a host-based application that performs remote copy over an IP LAN/WAN. Key features include asynchronous replication that can be scheduled to a fine granular level, Logical Unit Number (LUN), file or byte level. Other features include multiple replication configuration options including peer-to-peer and many-to-one. In addition, Storage Mirroring is a very cost effective disaster recovery alternative from one host to another within a LAN, storage center, or between direct attached storage in metro offices and regional centers. Additional configurations allow replication from small office environments to ensure business continuity without an outside IT staff.

For more information:

<http://h18006.www1.hp.com/products/storage/software/sm/index.html>

- **HP OpenView Storage Data Protector Software** - The HP OpenView Storage Data Protector software is enterprise data protection and disaster recovery, ensuring recovery from any disruption. Data Protector integrates a variety of techniques to eliminate backup and recovery windows. The capabilities to eliminate planned downtime range from online backup and backup of open files to zero-downtime, zero-impact backup. The software provides industry-leading instant recovery as well as several disaster recovery alternatives to eliminate unplanned downtime, allowing recovery of entire data centers in minutes.

Data Protector is enabling organizations to reduce costs by automating routine tasks to maximize the effectiveness of the data protection staff. For the price of an entry-level product, it provides the enterprise functionality customers need. Data Protector scales from single server to distributed enterprise, covering an extensive range of heterogeneous applications, operating environments and storage configurations with a single solution.

The ProLiant DL320s Storage Server supports using Data Protector as the backup software solution.

For more information on HP OpenView Data Storage Protector:

<http://h18006.www1.hp.com/products/storage/software/dataprotector/index.html>

- **HP StorageWorks File Migration Agent** - HP FMA is an automated solution designed to help simplify Windows-based file, web, and application server administration in small business to enterprise environments. This is accomplished through policy-based file migration and archive to popular storage targets, including HP StorageWorks Reference Information Storage System (RISS), HP StorageWorks File System Extender, and NAS, via Common Internet File System (CIFS). For more information:

<http://h18006.www1.hp.com/products/storage/software/fma/>

- **HP Systems Insight Manager Software** - HP SIM 5.x is the first unified server and storage management platform. Now, from a single management console, administrators can manage their complete HP server and storage environment with a feature rich, extensible and secure management tool set.

### Software Components

HP SIM also serves as a central access point for ProLiant Essentials, Integrity Essentials, and Storage Essentials software options that deliver targeted functionality for these platforms. For more information:

<http://h18013.www1.hp.com/products/servers/management/hpsim/index.html>

- **Insight Management Agents** - Allow all HP servers to present system instrumentation, health and configuration information into HP Systems Insight Manager and the HP System Management Homepage. The HP System Management Homepage aggregates systems data from Insight Management Agents and other HP management tools, providing a consolidated browser-based interface for managing individual servers.
- **HP Storage Essentials NAS Manager Software** - Provides comprehensive Network Attached Storage (NAS) management capabilities for HP ProLiant Storage Server. Visualize your distributed HP NAS solutions and centrally manage their capacity, performance, events, and dependencies to ensure NAS availability and performance and unify SAN and NAS management. For more information on the complete line of HP Storage Essential products go to: <http://www.hp.com/go/storageessential>

### *Service and Support, HP Care Pack, and Warranty Information*

#### **Storage Service Packages**

HP offers a portfolio of services ranging from Storage Design and Architecture that provides a complete multi-site design and implementation, to various levels of on-going maintenance support. Additionally the basic warranty service can be enhanced and/or HP Installation services can be purchased. Specifically Care Pack services include:

- Proactive 24 (P24)
- Support Plus 24 for Storage
- Support Plus for Storage
- 4-Hour, 24x7 Onsite, HW Support
- 4-Hour, 13x5 Onsite, HW Support
- Next Business Day Onsite, HW Support
- Installation for Storage (per event)
- Installation & Startup for Storage (per event)

HP offers an optional migration service to assist the customer in moving to the newest product release. This may be in the form of a defined kit and service, or may alternatively be performed on a time & material basis.

HP Services allows the customer to leverage HP's experience in selecting and configuring the most widely used security features, and provides an environment that is immediately more available due to increased change control and significantly improved data security.

For more information on these and other service options, please contact any of our worldwide sales offices or visit our web site at: <http://www.hp.com/hps/support>

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#### **Product Services**

- Installation services
- On-site maintenance (includes warranty support)
- Response time upgrades during the warranty period
- Post-warranty coverage
- Performance consulting via statement of work
- Migration service consulting via statement of work
- For additional hardware installation and maintenance information, please refer to the URLs listed below:  
<http://h18005.www1.hp.com/services/carepaq/us/install/>  
<http://h18005.www1.hp.com/services/carepaq/us/hardware/>

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#### **Installation and Startup Services**

The Installation and Startup Service package provides installation and configuration of HP StorageWorks products. Major categories of work could include:

- Pre-installation consulting and planning
- Hardware installation, configuration and verification
- Service tools installed, configured and verified
- Customer orientation

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#### **Warranty**

The HP ProLiant ML350 G5 Storage Server has a standard 3-3-3 warranty (Three years parts exchange, three years labor and three years on-site, next business day response).

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### Service and Support, HP Care Pack, and Warranty Information

#### Warranty Upgrade Options

- Response – Upgrade on-site response from next business day to same day 4-hours
- Coverage – Extend hours of coverage from 5 days x 9 hours to 7 days x 24 hours
- Duration – Select duration of coverage for a minimum period of 1 year or multiple years

The HP Care Pack is defined as an upgrade to the product warranty attribute, available for a specific duration and hours of coverage.

- HP Care Pack is not available for less than the product's warranty duration.
- HP Care Pack is available for sale anytime during the warranty period for most products, but the commencement date will be the same as the Warranty Start Date (delivery date to end user customer). Proof of purchase may be required.
- HP Care Pack services are prepaid.
- For additional HP Care Pack (hardware & software) information, as well as orderable part numbers, please refer to the URL listed below:  
<http://h18005.www1.hp.com/services/carepack/index.html>

#### Available HP Care Pack Services

Extend your product warranty with a wide choice of cost-saving support packages.

HP Care Pack Services are sold by HP and HP authorized enterprise and commercial resellers. Services for customers purchasing via direct and enterprise resellers are quoted using HP order configuration tools. Additional information about HP Care Pack Service features and benefits is available at <http://www.hp.com/hps/carepack/services/>.

Key for HP Care Pack Service availability in the table below:

**E** = Service available for customers purchasing direct and via enterprise resellers

**C** = Service available for customers purchasing via commercial resellers

**N/A** = Service not applicable

HP Care Pack Services Deployment and Per Event Services	Service Available
HP Installation	E (HA113A1) C (U7986E)
HP Installation & Startup	N/A
HP Implementation	N/A

For more information about Deployment and Per Event Services for HP Storage, visit <http://www.hp.com/hps/storage/>.

### Service and Support, HP Care Pack, and Warranty Information

<b>HP Care Pack Services Availability Services</b>	<b>1 yr</b>	<b>3 yr</b>	<b>4 yr</b>	<b>5 yr</b>
HP Next Day Hardware Support	N/A	N/A	N/A	N/A
HP 4 Hr, 9x5 HW Support	N/A	N/A	N/A	N/A
HP 4 Hr, 13x5 Hardware Support	N/A	N/A	N/A	N/A
HP 4 Hr, 24x7 Hardware Support	N/A	N/A	N/A	N/A
HP 6 HR Call-to-Repair HW Support	E (HA105A1) C (UC567E)	E (HA105A1) C (UC568E)	N/A	N/A
HP Software Support	N/A	N/A	N/A	N/A
HP Software Support 24x7	N/A	N/A	N/A	N/A
HP Support Plus	E (HA109A1) C (UB993E)	E (HA109A3) C (UB995E)	N/A	N/A
HP Support Plus 24	E (HA110A1) C (UB994E)	E (HA110A3) C (UC544E)	N/A	N/A
HP Proactive Essentials 9x5, 10 SW Incidents	N/A	N/A	N/A	N/A
HP Proactive Essentials 9x5, 25 SW Incidents	N/A	N/A	N/A	N/A
HP Proactive Essentials 9x5 Unlimited	N/A	N/A	N/A	N/A
HP Proactive Essentials 24x7, 25 SW Incidents	N/A	N/A	N/A	N/A
HP Proactive Essentials 24x7, 50 SW Incidents	N/A	N/A	N/A	N/A
HP Proactive Essentials 24x7 Unlimited	N/A	N/A	N/A	N/A
HP Proactive 24 Service	N/A	N/A	N/A	N/A
HP Critical Service	N/A	N/A	N/A	N/A

To find HP Care Pack Services available via HP authorized commercial resellers, visit [http://h30125.www3.hp.com/csn/salesmktg/elfpack/elf\\_nonlkup\\_etrylang.asp?code=ELNL](http://h30125.www3.hp.com/csn/salesmktg/elfpack/elf_nonlkup_etrylang.asp?code=ELNL)

Service and Support, HP Care Pack, and Warranty Information

eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment – from the desktop to the data center.

**Support Portal**

The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit <http://www.hp.com/support>

**Instant Support Enterprise Edition (ISEE)**

HP Instant Support Enterprise Edition (ISEE) provides a single remote monitoring and support solution for your IT data center. ISEE uses continuous hardware event monitoring and automated notification to identify and prevent potential critical problems.

ISEE is a feature of HP Hardware Support Onsite Service with Next-Day response or better, Proactive Essentials, Proactive 24, Critical Service and warranty support for the selected products.

For more information or to download ISEE, visit <http://www.hp.com/go/instant-support>

Components		The following brick level options/components do not have individual HP Care Pack Services. These items will be included in product HP Care Pack Services into which they are installed.				
Disk Drives	Tape Drives	CD/DVD ROM	SCSI Hubs in SBBs	Adapters		
Bus Converters	Backplane RAID Controllers	Power Supplies	Cabling	Fans		



### Product Configuration Wizard

In the following steps you will be guided through a series of steps to help you configuring a customized model.

**NOTE:** The steps outlined below are intended only as a guide for the options available. All options chosen are not be factory integrated or configured and ship as separate components.

### Step 1 – Choose a Model (required)

Select one of four available ML350 G5 Storage Server models

<b>HP ProLiant ML350 G5 Storage Server Common Specifications</b>	<b>Operating System</b>	Windows Storage Server 2003 Release 2, Standard Edition
	<b>Processor</b>	(1) Dual-Core Intel Xeon 5150 Processor (2.67 GHz, 65W, 1333MHz FSB)
	<b>Processor Cache</b>	4MB (1 x 4MB) Level 2 cache
	<b>Memory</b>	1 GB (2 x 512 MB)
	<b>Memory Type</b>	PC2-5300 Fully Buffered DIMMs (DDR2-667) with Advanced ECC; up to 4GB supported
	<b>Network Controller</b>	Embedded NC373i Multifunction Gigabit Server Adapter with TCP/IP Offload Engine
	<b>Storage Controller</b>	Smart Array E200i Controller with 128MB and BBWC
	<b>External Storage Support</b>	MSA20, MSA30, MSA60 and/or MSA70 storage enclosures can be added to the DL350 G5 Storage Server (all models) to expand storage capacity.
	<b>Optical Drive</b>	HP DVD+R/RW 16X Half Height
	<b>Form Factor</b>	Tower 5U
	<b>Remote Management</b>	iLO2 Port with Advance License Pack Included

<b>HP ProLiant ML350 G5 960GB Storage Server</b>	<b>Internal Storage</b>	(6) 160GB 1.5G SATA 7.2K 3.5" HDDs
AE418A, Americas		
AE419A, Asia Pacific		
AE420A, Europe		
AE421A, Australia		

<b>HP ProLiant ML350 G5 1.5TB Storage Server</b>	<b>Internal Storage</b>	(6) 250GB 1.5G SATA 7.2K 3.5" HDDs
AE423A, Americas		
AE424A, Asia Pacific		
AE425A, Europe		
AE426A, Australia		

<b>HP ProLiant ML350 G5 3TB Storage Server</b>	<b>Internal Storage</b>	(6) 500GB 1.5G SATA 7.2K 3.5" HDDs
AE428A, Americas		
AE429A, Asia Pacific		
AE430A, Europe		
AE431A, Australia		

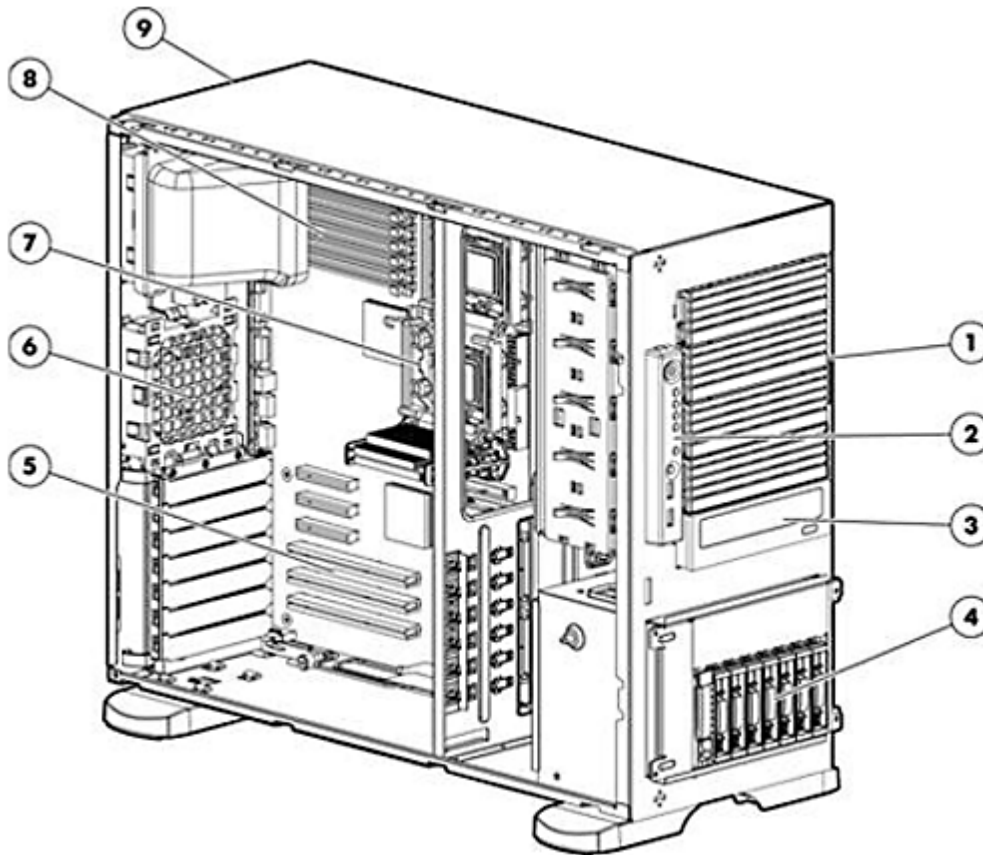
### Product Configuration Wizard

**HP ProLiant ML350 G5 Internal Storage  
1.8TB SAS Storage  
Server**

(6) 300GB 3G SAS 15K 3.5" HDDs

AG580A, Americas  
AG586A, Asia Pacific  
AG587A, Europe  
AG588A, Australia

### Model Design



- |  |  |
|--|--|
| 1. Four available removable media bays   | 6. Redundant system fans standard  |
| 2. Front display panel; includes power button, UID, two USB 2.0 ports, and system status LED's | 7. Support for two Intel Dual-Core Xeon 5150 (2.67 GHz, 1333 FSB) processors |
| 3. HP DVD+R/RW 16X Half-Height   | 8. Eight PC2-5300 FB-DIMM (DDR2 667) sockets                                 |
| 4. Six LFF (3.5") SAS or SATA Hot Plug drive bays (not shown here)                             | 9. Redundant Hot-Plug power supplies standard                                |
| 5. Six expansion slots (three PCI Express, three PCI-X)  |  |

### Step 2 - Add Second Processor

You may add a second processor to a HP ProLiant ML350 G5 Storage Server Model

**Processor** Dual-Core Intel Xeon Processor 5150 (2.67 GHz, 65W, 1333MHz FSB)

416890-B21

### Product Configuration Wizard

#### Step 3 - Add More Memory

**NOTE:** System comes standard with 1 GB (2 x 512MB) of memory and is expandable to an operating system limit of 4 GB

<b>Memory (DIMMs)</b>	512 MB FBD PC2-5300 1 x 512 MB Kit	413507-B21
	1 GB FBD PC2-5300 2 x 512 MB Kit	397409-B21
	2 GB FBD PC2-5300 2 x 1 GB Kit	397411-B21
	4 GB FBD PC2-5300 2 x 2 GB Kit	397413-B21

#### Step 4 - Add Network Cards

Embedded NC373i Multifunction Gigabit Server Adapter with TCP/IP Offload Engine standard. Select additional cards for higher performance and further redundancy.

**NOTE:** Multifunction Server Adapters-including the embedded NC373i-require installation of the Microsoft Windows Server 2003 Scalable Networking Pack (a free download from Microsoft) to enable TCP Chimney offload, Receive-side Scaling (RSS), and Network Direct Memory Access (NetDMA) features.

<b>Communications</b>	HP NC110T PCI Express Gigabit Server Adapter	434905-B21
	HP NC150T PCI 4-port Gigabit 1000T Combo Switch Adapter	367132-B21
	HP NC310F PCI-X 1000SX Gigabit Server Adapter	368169-B21
	HP NC340T PCI-X 4-port 1000T Gigabit Server Adapter	391661-B21
	HP NC360T PCI Express Dual Port Gigabit Server Adapter	412648-B21
	HP NC373T PCI Express Multifunction Gigabit Server Adapter	394791-B21
	HP NC373F PCI Express Multifunction Gigabit Server Adapter	394793-B21
	HP NC380T PCI Express Dual Port Multifunction Gigabit Server Adapter	394795-B21
	HP NC510F PCIe 10 Gigabit Server Adapter	414126-B21
	<b>NOTE:</b> A minimum of 1 gigabyte (1 GB) of server memory is required per each NC510F adapter.	
	HP NC510C PCIe 10 Gigabit Server Adapter	414129-B21
	<b>NOTE:</b> A minimum of 1 gigabyte (1 GB) of server memory is required per each NC510C adapter.	

#### Step 5 - Add External Storage

ProLiant ML350 G5 Storage Servers come standard with an embedded Smart Array E200i/128MB controller for internal drives. Select additional controllers from the list below to accommodate external expansion.

**NOTE:** Please consult specifications for available expansion slots when ordering additional storage controllers.

<b>Storage Controllers</b>	<b>NOTE:</b> Please refer to the HP ProLiant DL380 G5 SCSI Cabling Matrix for information on what's required to cable optional array controllers: <a href="ftp://ftp.compaq.com/pub/products/servers/proliantdl380/dl380g4-cabling-matrix.pdf">ftp://ftp.compaq.com/pub/products/servers/proliantdl380/dl380g4-cabling-matrix.pdf</a>	
	<b>SAS Controllers</b>	
	<b>Smart Array P400 Controller</b>	
	HP Smart Array P400/256MB Controller	405132-B21
	HP Smart Array P400 Controller/512MB and BBWC	411064-B21

### Product Configuration Wizard

512MB Battery-backed cache upgrade	405148-B21
<b>NOTE:</b> For Smart Array P400 Controller.	
Battery-backed write cache upgrade	383280-B21
<b>NOTE:</b> For Smart Array P400 Controller.	
Smart Array P400 Battery Attach Kit	417836-B21
<b>NOTE:</b> This option kit contains a 24" battery cable and adhesive material for installing a battery into the server if a Smart Array P400 is integrated outside of the factory. For all solutions, please refer to the server QuickSpecs and User's Manual for detailed installation instructions.	
<b>Smart Array P800 Controller</b>	
HP Smart Array P800/512 BBWC Controller	381513-B21
<b>Smart Array E200 Controller</b>	
HP Smart Array E200/128 Controller	411508-B21
HP Smart Array E200/64 Controller	409180-B21
128-MB BBWC (Battery-Backed Write Cache) Enabler	351580-B21
<b>NOTE:</b> Supports the Smart Array E200 Controller, Smart Array 641 Controller, and Smart Array 642 Controller.	
<b>Smart Array P600 Controller</b>	
HP Smart Array P600 Controller	337972-B21
<b>NOTE:</b> Requires Mixed PCI-E/X riser cage.	
512 MB Battery-Backed Cache Upgrade	372538-B21
<b>NOTE:</b> This 512-MB Battery-Backed Cache Module upgrade kit supports the Smart Array P600 Controller and the Smart Array 6400 series Controller.	
<b>NOTE:</b> Please see the following Controller QuickSpecs for Technical Specifications such as PCI Bus, PCI Peak Data Transfer Rate, SCSI Protocols supported, SCSI Peak Data Transfer Rate, Channels, SCSI Ports, Drives supported, Cache, RAID support, and additional information:	
<a href="http://h18000.www1.hp.com/products/quickspecs/12460_div/12460_div.HTML">http://h18000.www1.hp.com/products/quickspecs/12460_div/12460_div.HTML</a>	
(Smart Array E200 Controller)	
<a href="http://h18000.www1.hp.com/products/quickspecs/12400_div/12400_div.HTML">http://h18000.www1.hp.com/products/quickspecs/12400_div/12400_div.HTML</a>	
(Smart Array P400 Controller)	
<a href="http://h18000.www1.hp.com/products/quickspecs/12247_div/12247_div.HTML">http://h18000.www1.hp.com/products/quickspecs/12247_div/12247_div.HTML</a>	
(Smart Array P600 Controller)	
<a href="http://h18000.www1.hp.com/products/quickspecs/12616_div/12616_div.HTML">http://h18000.www1.hp.com/products/quickspecs/12616_div/12616_div.HTML</a>	
(Smart Array P800 Controller)	
<b>SAS HBA</b>	
HP SC44Ge Host Bus Adapter	416096-B21
HP 8 Internal Port SAS HBA with RAID	347786-B21
<b>NOTE:</b> Please see the following QuickSpecs for additional information:	
<a href="http://h18004.www1.hp.com/products/quickspecs/12332_div/12332_div.html">http://h18004.www1.hp.com/products/quickspecs/12332_div/12332_div.html</a>	
(SAS HBA)	
<b>SCSI Controllers for External Drive/Storage Support</b>	
Smart Array 6402/128 Controller (PCI-X)	273915-B21
<b>NOTE:</b> Ultra320 SCSI.	
Smart Array 6404/256 Controller (PCI-X)	273914-B21
<b>NOTE:</b> Ultra320 SCSI.	
Smart Array 642 Controller (PCI-X)	291967-B21
<b>NOTE:</b> Ultra320 SCSI.	

### Product Configuration Wizard

128-MB Battery-Backed Write Cache (BBWC)	351580-B21
<b>NOTE:</b> Supports the Smart Array E200 Controller, Smart Array 641 Controller, and Smart Array 642 Controller.	
Ultra320 Expansion Module for SA-6402	273911-B21
64-Bit/133-MHz (PCI-X) Single Channel Ultra320 SCSI HBA G2	374654-B21
HP SC11Xe Host Bus Adapter (PCI-e)	412911-B21
<b>NOTE:</b> Please see the following QuickSpecs for Technical Specifications and additional information:	
<a href="http://h18000.www1.hp.com/products/quickspecs/11943_div/11943_div.HTML">http://h18000.www1.hp.com/products/quickspecs/11943_div/11943_div.HTML</a> (Single Channel Ultra320 SCSI HBA)	
<a href="http://h18000.www1.hp.com/products/quickspecs/11587_div/11587_div.HTML">http://h18000.www1.hp.com/products/quickspecs/11587_div/11587_div.HTML</a> (Smart Array 6400 Series)	
<a href="http://h18000.www1.hp.com/products/quickspecs/12069_div/12069_div.HTML">http://h18000.www1.hp.com/products/quickspecs/12069_div/12069_div.HTML</a> (Smart Array 642)	
<a href="http://h18000.www1.hp.com/products/quickspecs/12566_div/12566_div.HTML">http://h18000.www1.hp.com/products/quickspecs/12566_div/12566_div.HTML</a> (SC11Xe HBA)	

### Fibre-channel Host Bus Adapters **NOTE:** For the complete listing of Fibre Channel Host Bus Adapters, please see: <http://h18006.www1.hp.com/storage/saninfrastructure/hba.html>

HP StorageWorks FC2142SR 4Gb PCI-e HBA	A8002A
HP StorageWorks FC2242SR Dual Channel 4 Gb PCI-e HBA	A8003A
HP StorageWorks FC1142SR 4Gb PCI-e HBA	AE311A
HP StorageWorks FC1242SR Dual Channel 4 Gb PCI-e HBA	AE312A
HP StorageWorks FC2143 4Gb PCI-X 2.0 -to-Fibre Channel HBA	AD167A
HP StorageWorks FC2243 Dual Channel 4Gb PCI-X 2.0 HBA	AD168A
HP StorageWorks FC1143 4Gb PCI-X 2.0 HBA	AB429A
HP StorageWorks FC1243 Dual Channel 4Gb PCI-X 2.0 HBA	AE369A

### External Storage Enclosures

#### HP StorageWorks Modular Smart Arrays

HP StorageWorks Modular Smart Array 20	335921-B21
<b>NOTE:</b> Rack-mountable 12 (SATA) drive enclosure with U320 Host connectivity, redundant power supplies	
HP StorageWorks Modular Smart Array 20 Starter Kit	366172-B21
<b>NOTE:</b> Rack-mountable 12 (SATA) drive enclosure with U320 Host connectivity, redundant power supplies. Includes Smart Array 6402/128 Controller.	
<b>NOTE:</b> The Modular Smart Array Enclosure 20 Family supports the SATA 1.5Gb/s 3.5" Hot Plug Hard Drives.	
HP StorageWorks Modular Smart Array 30 Single Bus	302969-B21
<b>NOTE:</b> Rack-mountable 14 drive (SCSI) drive enclosure with single bus, redundant power supplies.	
HP StorageWorks Modular Smart Array 30 Dual Bus	302970-B21
<b>NOTE:</b> Rack-mountable 14 drive (SCSI) drive enclosure with dual bus, redundant power supplies.	
<b>NOTE:</b> The Modular Smart Array Enclosure 30 Family supports the Wide Ultra3, Ultra320 Hot Plug Hard Drives	

### Product Configuration Wizard

HP StorageWorks Modular Smart Array 50 Enclosure	364430-B21
<b>NOTE:</b> Please see the Modular Smart Array 50 QuickSpecs for additional information including configuration steps and additional options needed for a complete solution at: <a href="http://h18000.www1.hp.com/products/quickspecs/12245_div/12245_div.HTML">http://h18000.www1.hp.com/products/quickspecs/12245_div/12245_div.HTML</a> (Worldwide)	
HP StorageWorks 60 Modular Smart Array	418408-B21
<b>NOTE:</b> Rack-mountable 12 drive (3.5" SAS/SATA) enclosure with 3Gb/s SAS host connectivity and redundant power supplies.	
HP StorageWorks 70 Modular Smart Array	418800-B21
<b>NOTE:</b> Rack-mountable 25 drive (2.5" SAS/SATA) enclosure with 3Gb/s SAS host connectivity and redundant power supplies.	
HP StorageWorks Modular Smart Array 500 Generation 2	335880-B21
<b>NOTE:</b> Please see the Modular Smart Array 500 Generation 2 QuickSpecs for additional information including configuration steps and additional options needed for a complete solution at: <a href="http://h18000.www1.hp.com/products/quickspecs/11956_div/11956_div.HTML">http://h18000.www1.hp.com/products/quickspecs/11956_div/11956_div.HTML</a> (Worldwide)	
HP StorageWorks 1000 Modular Smart Array	201723-B22
<b>NOTE:</b> This array enclosure requires addition of a Fibre Channel Host Bus Adapter <b>NOTE:</b> Please see the Modular Smart Array 1000 QuickSpecs for additional options and configuration information at <a href="http://h18000.www1.hp.com/products/quickspecs/11033_div/11033_div.HTML">http://h18000.www1.hp.com/products/quickspecs/11033_div/11033_div.HTML</a> (Worldwide)	
HP StorageWorks 1500 cs Modular Smart Array	AA986A
<b>NOTE:</b> This array enclosure requires addition of a Fibre Channel Host Bus Adapter <b>NOTE:</b> Please see the StorageWorks Modular SAN Array 1500 cs QuickSpecs for additional options and configuration information at: <a href="http://www.hp.com/go/MSA1500cs">http://www.hp.com/go/MSA1500cs</a>	

#### Serial Attached SCSI (SAS) Hard Drives

##### Hot Plug 3.5" SAS Drives

HP 300GB 15K SAS 3.5" HDD	431944-B21
HP 146GB 15K SAS 3.5" HDD	375872-B21
HP 72GB 15K SAS 3.5" HDD	375870-B21
HP 36GB 15K SAS 3.5" HDD	375868-B21

##### Hot Plug SFF SAS Drives

HP 146GB 3G SAS 10K SFF SP HDD	431958-B21
HP 72GB 3G SAS 10K SFF SP HDD	375861-B21
HP 72GB 3G SAS 15K SFF SP HDD	431935-B21
HP 36GB 3G SAS 10K SFF SP HDD	375859-B21
HP 36GB 3G SAS 15K SFF SP HDD	431933-B21

**NOTE:** Please see the SAS Hard Drive QuickSpecs for Technical Specifications such as capacity, height, width, interface, transfer rate, seek time, physical configuration, and operating temperature:  
[http://h18000.www1.hp.com/products/quickspecs/12244\\_div/12244\\_div.HTML](http://h18000.www1.hp.com/products/quickspecs/12244_div/12244_div.HTML)  
 (Worldwide)



Serial ATA (SATA) Hard Drives	Hot Plug 3.5" SATA Drives	
	HP 750GB 1.5G SATA 7.2K 3.5" HDD	432341-B21
	HP 500GB 1.5G SATA 7.2K 3.5" HDD	395473-B21
	HP 250GB 1.5G SATA 7.2K 3.5" HDD	349239-B21
	HP 160GB 1.5G SATA 7.2K 3.5" HDD	349238-B21
	HP 80GB 1.5G SATA 7.2K 3.5" HDD	349237-B21
	Hot Plug SFF SATA Drives	
	HP 60GB 1.5G SATA 5.4K SFF HDD	379306-B21
<b>NOTE:</b> SATA drives have a 1 year warranty. Please see the SATA Hard Drive QuickSpecs for Technical Specifications such as capacity, height, width, interface, transfer rate, seek time, physical configuration, and operating temperature: <a href="http://h18000.www1.hp.com/products/quickspecs/11940_div/11940_div.html">http://h18000.www1.hp.com/products/quickspecs/11940_div/11940_div.html</a> (Worldwide)		

## Step 6 - Add Optional Software

Microsoft® iSCSI Software Target	Microsoft iSCSI Software Target adds block storage capability to ProLiant Storage Servers and creates a single platform that delivers file, print, and application storage services, all over existing Ethernet networks. It is a powerful iSCSI software solution that provides affordable application storage provisioning, protection, and availability for small and medium office environments. It helps administrators consolidate storage capacity, improve storage utilization, minimize system downtime, simplify backup operations, enable rapid recovery, and provides high availability for key applications and services..	
	Microsoft iSCSI Target Software 1 LTU	T4433A
	<b>NOTE:</b> For more information go to HP's Microsoft® iSCSI Software Target website at: <a href="http://h18006.www1.hp.com/products/storageworks/ms_iscsi/index.html">http://h18006.www1.hp.com/products/storageworks/ms_iscsi/index.html</a>	

Product Configuration Wizard

HP StorageWorks  
Storage Mirroring  
Software

HP StorageWorks Storage Mirroring (SM) Software is an ideal entry host-based software product for IP networks. SM does not require high bandwidth Fibre Channel networks, high capacity replication and zero down time service levels. Storage Mirroring provides near real-time full application or file recovery up to the last byte replication. SM is an excellent choice for low bandwidth; low storage volume changes and meets business recovery goals within tens of minutes or hours. The immediate return on investment is realized in the reduced management cost associated with branch or small offices networks.

Product Highlights:

- High availability with Microsoft Windows 2000/NT/2003servers
- Application aware and supported with Exchange, SQL and Oracle
- Host-based remote storage copy with TCP/IP networks
- Data distribution one-to-many or 'fan-out' to multiple destinations
- Data migration utility for transferring large data projects
- Centralize backup, data protection and recovery operations
- Built in scheduler for off hours replication
- Built in network bandwidth utilization management
- Disaster recovery between source and destination failover sites
- Powered by NSI Software's Double-Take patented 'Sequential Transfer Asynchronous Replication' technology
- Sequential transfer maintains write sequential across multiple files for data integrity
- Asynchronous replication allows hosts to continue processing for maximum performance

HP StorageWorks Storage Mirroring Media Kit v4.5	T4440A
HP StorageWorks Storage Mirroring NAS Edition LTU 1	T4445A
HP StorageWorks Storage Mirroring NAS Edition LTU 10	T4446A

NOTE: For more information go to the HP StorageWorks Storage Mirroring website at:  
<http://h18006.www1.hp.com/products/storage/software/sm/index.html>

Step 7 - Add Tape Backup Solution



### Product Configuration Wizard

#### Tape Drives

**NOTE:** A separate SCSI Controller is required for connecting SCSI tape drives to this server.

**NOTE:** For the complete listing of Tape Drive offerings, please see:  
<http://www.hp.com/products1/storage/compatibility/tapebackup/ISS/index.html>

For recommended tape drive offerings for this ProLiant server see the following:

#### USB Tape Drives

HP StorageWorks DAT 72 USB Internal Tape Drive (Carbonite)	DW026A
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#### SAS Tape Drives

**NOTE:** Connecting hard drive cage and SAS tape to the same SAS Controller using split cable (supplied with tape drive) deactivates 1 of the hard drive bays. Actual hard drive bay deactivated depends on where split cable plugs into SAS drive connector. Example: 3x SAS cable connector plugged into SAS drive connector (5-8) on the back of the hard drive cage would mean drive bay 8 is deactivated.

HP StorageWorks Ultrium 448 SAS Internal Tape Drive	DW085A
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HP StorageWorks Ultrium 920 SAS Internal Tape Drive	EH847A
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**NOTE:** Please refer to the "Tape Drives, Tape Autoloaders & Tape Libraries" table in the Storage section of this document for a list of SAS controllers with tape support.

#### Ultrium Tape Drives – Internal, Rack-Mount and Array

HP StorageWorks Ultrium 232 Internal Tape Drive (Carbonite)	DW064A
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HP StorageWorks Ultrium 460 Internal Tape Drive (Carbon)	Q1518B
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HP StorageWorks Ultrium 448 Internal Tape Drive (Carbonite)	DW016A
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HP StorageWorks Ultrium 920 SCSI Internal Tape Drive	EH841A
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HP StorageWorks Ultrium 960 Internal Tape Drive (Carbonite)	Q1538A
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<b>NOTE:</b> Please see the HP StorageWorks Ultrium Tape Drive QuickSpecs for additional options such as controllers, media, and other related items:	Q1539B
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[http://h18006.www1.hp.com/products/quickspecs/11739\\_div/11739\\_div.html](http://h18006.www1.hp.com/products/quickspecs/11739_div/11739_div.html)  
(Worldwide)

[http://h18006.www1.hp.com/products/quickspecs/12128\\_div/12128\\_div.html](http://h18006.www1.hp.com/products/quickspecs/12128_div/12128_div.html)  
(Worldwide)

<b>NOTE:</b> For an up-to-date listing of the latest O/S and software support details for HP Ultrium tape drives, please visit: <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a> .	Q1595B
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#### DAT Drives – Internal and Rack-Mount

HP StorageWorks DAT 72 SCSI Internal Tape Drive (Carbon)	Q1522B
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### Product Configuration Wizard

#### Tape Autoloaders

##### HP StorageWorks DAT Autoloader

HP StorageWorks DAT 72x10 tape autoloader AE313A

##### HP StorageWorks 1/8 Tape Autoloader

HP StorageWorks 1/8 Ultrium 960 Tape Autoloader AF204A

HP StorageWorks 1/8 Ultrium 920 G2 Tape Autoloader AH165A

HP StorageWorks 1/8 Ultrium 448 G2 Tape Autoloader AH164A

HP StorageWorks 1/8 Ultrium 232 G2 Tape Autoloader AH163A

HP StorageWorks 1/8 G2 Tape Autoloader Rack Kit AH166A

**NOTE:** Required to install the 1/8 G2 Autoloaders in a standard 19-inch rack; includes rails and rackmount instructions

1/8 Tape Autoloader Rackmount Kit C9268R

**NOTE:** Required to install the unit in a standard 19-inch rack; includes rails and rackmount instructions

**NOTE:** Please reference the 1/8 Tape Autoloader QuickSpecs at <http://www.hp.com/go/automation> for additional information needed to create a complete solution; reference current compatibility information at <http://www.hp.com/go/ebs>

#### Tape Libraries

##### HP StorageWorks MSL2024 Tape Library

HP StorageWorks MSL2024 1 Ultrium 960 Drive Library AG115A

HP StorageWorks MSL2024 1 Ultrium 960 4GB FC Drive Library AG326B

HP StorageWorks MSL2024 1 Ultrium 920 Drive Library AH169A

HP StorageWorks MSL2024 2 Ultrium 920 Drive Library AH170A

HP StorageWorks MSL2024 1 Ultrium 448 Drive Library AG116A

HP StorageWorks MSL2024 2 Ultrium 448 Drive Library AG117A

##### HP StorageWorks MSL4048 Tape Library

HP StorageWorks MSL4048 1 Ultrium 448 Drive Library AG320A

HP StorageWorks MSL4048 2 Ultrium 448 Drive Library AG321A

HP StorageWorks MSL4048 1 Ultrium 920 Drive Library AH171A

HP StorageWorks MSL4048 2 Ultrium 920 Drive Library AH172A

HP StorageWorks MSL4048 1 Ultrium 960 Drive Library AG322A

HP StorageWorks MSL4048 1 Ultrium 960 4GB FC Drive Library AG324B

HP StorageWorks MSL4048 2 Ultrium 960 Drive Library AG323A

HP StorageWorks MSL4048 2 Ultrium 960 4GB FC Drive Library AG325B

##### HP StorageWorks MSL6000 Tape Library

###### Ultrium 960 technology

HP StorageWorks MSL6030 1 Ultrium 960 Dr LVDS Library AD606B

HP StorageWorks MSL6030 1 Ultrium 960 Dr FC Library AD608B

HP StorageWorks MSL6030 2 Ultrium 960 Dr LVDS Library AD607B

HP StorageWorks MSL6030 2 Ultrium 960 Dr FC Library AD609B

###### Ultrium 460 technology

HP StorageWorks MSL6030 1 Ultrium 460 Dr LVDS Library AD598B

HP StorageWorks MSL6030 1 Ultrium 460 Dr FC Library AD600B

HP StorageWorks MSL6030 2 Ultrium 460 Dr LVDS Library AD599B

HP StorageWorks MSL6030 2 Ultrium 460 Dr FC Library AD601B

### Product Configuration Wizard

**NOTE:** Please reference the MSL2024, MSL4048 and MSL6000 Tape Library QuickSpecs at <http://www.hp.com/go/automation> for additional information needed to create a complete solution; reference current compatibility information at <http://www.hp.com/go/ebs>

#### HP Data Protector Express Software

HP DP Express Backup Server Upgrade for ProLiant Software

BB117AP

HP DP Express Package for Microsoft Small Business Server

BB118AA

**NOTE:** To obtain a free licensed copy of HP Data Protector Express for ProLiant edition software, please visit the "Protect Your Data" link accessible from your ProLiant server's System Management Homepage (SMH) software (SmartStart 7.5 or later).

**NOTE:** Please see the HP Data Protector Express QuickSpecs for additional information regarding the purchase of HP Data Protector Express software: [http://h18000.www1.hp.com/products/quickspecs/12337\\_div/12337\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12337_div/12337_div.html) (Worldwide)

### Step 8 - Add UPS, Power and Rack Options

#### Uninterruptible Power Systems – Tower

HP, T1000 UPS NA

AF403A

HP, T1000 UPS JPN

AF404A

HP, T1000 UPS INTL

AF405A

HP, T1500 UPS NA

AF406A

HP, T1500 UPS JPN

AF407A

HP, T1500 UPS INTL

AF408A

HP, R/T 2200 UPS NA

AF409A

HP, R/T 2200 UPS JPN

AF410A

HP, R/T 2200 UPS INTL

AF411A

#### Uninterruptible Power Systems – Rack

HP, R1.5kVA UPS, 1U, NA

AF419A

HP, R1.5kVA UPS, 1U, INTL

AF418A

HP, R1.5kVA UPS, 1U, JPN/TW

AF421A

HP R3000 VA UPS, 2U, DTC, INTL

AF414A

HP R3000 VA UPS, 2U, L5-30, NA

AF422A

HP R3000 VA UPS, 2U, L6-20, NA

AF423A

HP R3000 VA UPS, 2U, L6-20, JPN

AF424A

HP R3000 VA UPS, 2U, L5-30, JPN

AF425A

HP R5500 VA UPS, INTL

AF416A

HP R5500 VA UPS, NA/JPN

AF426A

### Product Configuration Wizard

HP Monitored Power Distribution Unit (PDU)	HP Monitored Power Distribution Unit: Full Rack Version	
	17.3 kVA Monitored PDU Model S2324	AF503A
	8.6 kVA Monitored PDU Model S1324	AF504A
	16.6 kVA Monitored PDU Model S2140	AF505A
	8.3 kVA Monitored PDU Model S1140	AF506A
	22 kVA Monitored PDU Model S2316	AF507A
	11 kVA Monitored PDU Model S1316	AF508A
	14.7 kVA Monitored PDU Model S2132	AF509A
	7.3 kVA Monitored PDU Model S1132	AF510A
	4.9kVA Monitored PDU model S124	AF914A
	7.3kVA Monitored PDU model S132	AF915A

Modular PDUs 1U/0U (Up to 32 outlets)		
<b>NOTE:</b> 1U/0U mounting brackets shipped with the unit (optimized for 10000 and 9000 series racks).	3.6kVA Model - mPDU, 16A, High (WW)	252663-B24
	2.8 kVA Model - mPDU, 24A, Low (NA/JPN)	252663-D71
	4.9kVA Model - mPDU, 24A, High (NA/JPN)	252663-D72
	7.3kVA Model - mPDU, 32A, High (INT'L)	252663-B31
	8.3kVA Model - mPDU, 40A, High (WW)	252663-B21
	8.3kVA Model - mPDU, 40A, High (power cord attached) (NA/JPN)	252663-D73
	9.2kVA Model - mPDU, 40A, High (power cord attached) (INT'L)	252663-B32
	8.3kVA Model - mPDU 40A, High (core only) (NA/JPN)	252663-D75
	9.2kVA Model - mPDU 40 A, High (core only) (Int'l)	252663-B34
	8.3kVA Model - mPDU 32A, High (core only) (Int'l)	252663-B33
	4.9kVA Model - mPDU 24A, High (core only) (NA/JPN)	252663-D74

**NOTE:** Please see the following Modular Power Distribution Unit (Zero-U/1U Modular PDUs) QuickSpecs for additional options including shorter jumper cables and country specific power cords:  
[http://h18000.www1.hp.com/products/quickspecs/11041\\_div/11041\\_div.HTML](http://h18000.www1.hp.com/products/quickspecs/11041_div/11041_div.HTML)  
 (Worldwide)

Rack Conversion Kit	HP ML350 G5 Tower to Rack Conversion Kit	412640-B21
	ProLiant DL380 G5, ML370 G5, ML350 G5 Shipping Bracket for Round Hole Racks	371482-B21
	<b>NOTE:</b> This kit is required if the server will be configured and shipped within a round hole rack.	

HP Rack 5000 Series (Graphite Metallic)	HP 5642 Rack-Unassembled	358254-B21
	<b>NOTE:</b> Please see the HP Rack 5642 QuickSpecs for additional part numbers and Technical Specifications such as height, width, depth, weight, and color: <a href="http://h18000.www1.hp.com/products/quickspecs/12074_div/12074_div.HTML">http://h18000.www1.hp.com/products/quickspecs/12074_div/12074_div.HTML</a> (Worldwide)	
	<b>NOTE:</b> For additional information regarding Rack Cabinets, please see the following URL: <a href="http://www.hp.com/go/rackandpower">http://www.hp.com/go/rackandpower</a> .	

### Product Configuration Wizard

<b>HP Rack 10000 G2 Series</b> (Carbon/Graphite Metallic)	10642 G2 (42U) Rack Cabinet – Pallet	AF001A
	10642 G2 (42U) Rack Cabinet – Shock Pallet	AF002A
	10642 G2 (42U) Rack Cabinet – Crated	AF003A
	10642 G2 (42U) Rack Cabinet, with Extension – Shock Pallet	AF004A
	10636 G2 (36U) Rack Cabinet – Pallet	AF011A
	10636 G2 (36U) Rack Cabinet – Shock Pallet	AF012A
	10636 G2 (36U) Rack Cabinet – Crated	AF013A
	10636 G2 (36U) Rack Cabinet, with Extension – Shock Pallet	AF014A
	10622 G2 (22U) Rack Cabinet - Pallet	AF021A
	10622 G2 (22U) Rack Cabinet - Shock Pallet	AF022A
	10842 G2 (42U) 800mm Wide Rack Cabinet - Pallet	AF041A
	10842 G2 (42U) 800mm Wide Rack Cabinet - Shock Pallet	AF042A
	10647 G2 (47U) Rack Cabinet - Pallet	AF031A

**NOTE:** It is mandatory to use a shock pallet when shipping racks with equipment installed.

**NOTE:** Please see the Rack 10000 G2 QuickSpecs for Technical Specifications such as height, width, depth, weight, and color:

[http://h18000.www1.hp.com/products/quickspecs/12402\\_div/12402\\_div.HTML](http://h18000.www1.hp.com/products/quickspecs/12402_div/12402_div.HTML) (Worldwide)

**NOTE:** For additional information regarding Rack Cabinets, please see the following URL: <http://www.hp.com/go/rackandpower>.

<b>HP Rack 10000 Series</b> (Graphite Metallic)	HP S10614 (14U) Rack Cabinet – Shock Pallet	292302-B22
	HP 10842 (42U) Rack Cabinet – Pallet	257415-B21
	HP 10842 (42U) Rack Cabinet – Shock Pallet	257415-B22
	HP 10647 (47U) Rack Cabinet – Pallet	245160-B21
	HP 10647 (47U) Rack Cabinet – Crated	245160-B23
	HP 10622 (22U) Rack Cabinet – Pallet	245163-B21
	HP 10622 (22U) Rack Cabinet – Shock Pallet	245163-B22
	HP 10622 (22U) Rack Cabinet – Crated	245163-B23

**NOTE:** xxxxxx-B21 (pallet) used to ship empty racks shipped on a truck. -B22 (shock pallet) used to ship racks with equipment installed (by custom systems, VARs and Channels). xxxxxx-B23 (crated) used for air shipments of empty racks.

**NOTE:** It is mandatory to use a shock pallet in order to ship racks with equipment installed. Not all Compaq equipment is qualified to be shipped in the Rack 10000 series.

**NOTE:** Please see the Rack 10000 QuickSpecs for additional options and Technical Specifications such as height, width, depth, weight, and color:

[http://h18000.www1.hp.com/products/quickspecs/10995\\_div/10995\\_div.HTML](http://h18000.www1.hp.com/products/quickspecs/10995_div/10995_div.HTML) (Worldwide)

**NOTE:** For additional information regarding Rack Cabinets, please see the following URL: <http://www.hp.com/go/rackandpower>

### Memory

#### HP ProLiant ML350 G5 Memory Configuration

The HP ProLiant ML350 G5 requires memory interleaving when more than one DIMM is installed. For interleaving, DIMMs must be configured in identical pairs. The system will not boot properly if multiple DIMMs of varying density or type are installed in the system.

#### Standard Memory

All HP ProLiant ML350 G5 Storage Server models ship 1GB (2 x 512MB) of PC2-5300 Fully Buffered DIMMs (DDR2-667).

#### Common Memory Configuration

Valid DIMM pair combinations use slots 1/5, slots 2/6, slots 3/7, and slots 4/8.

**NOTE:** Chart does not represent all possible memory configurations.

Memory		Slot							
		1	2	3	4	5	6	7	8
Standard	1 GB	512 MB	Empty	Empty	Empty	512 MB	Empty	Empty	Empty
Maximum*	4 GB	1 GB	1 GB	Empty	Empty	1 GB	1 GB	Empty	Empty

**NOTE:** The Windows Storage Server 2003 R2 Standard Edition Operating System installed on all ML350 G5 Storage Server models limits maximum memory capacity to 4GB.

To see the memory options available from HP go to Step 3 - add additional memory.

#### Online spare memory configuration

FBDIMMs can either be single-rank or dual-rank. Certain FBDIMM configuration requirements are based on these classifications. A dual-rank FBDIMM is similar to having two separate FBDIMMs, or ranks, on the same module. Although only a single FBDIMM module, a dual-rank FBDIMM acts as two separate FBDIMMs.

In online spare mode, a single rank of memory acts as the spare memory. For single-rank FBDIMMs, the entire FBDIMM acts as the spare memory. For a dual-rank FBDIMM, only half of the FBDIMM acts as the spare memory while the other half is available for operating system and application usage.

Online spare FBDIMM configuration requirements (in addition to general configuration requirements):

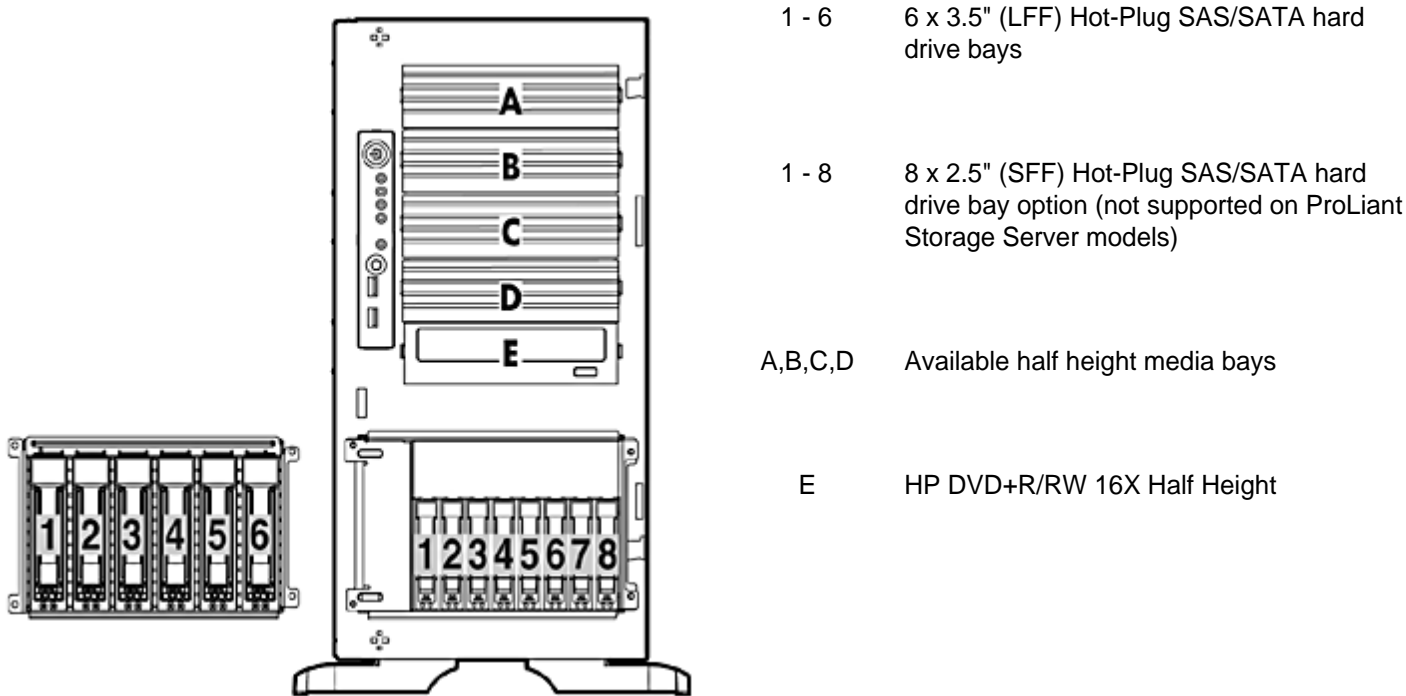
- When only bank A is being used, it must be fully populated with dual-rank FBDIMMs.
- For optimum memory usage, HP recommends all FBDIMMs be the same size with the same HP part number. If different sized FBDIMMs are used, a portion of the installed memory may not be utilized.

In online spare mode, FBDIMMs must be populated as specified in the following table:

- Configuration 1 (Bank A only) is only supported if using bank A, populated with dual-rank FBDIMMs.
- After installing FBDIMMs, use RBSU to configure the system for online spare memory support.

Bank A 1A and 5A	Bank B 2B and 6B	Bank C 3C and 7C	Bank D 4D and 8D
X	-	-	-
X	X	-	-
X	X	X	X

Storage



Drive Support

	Quantity Supported	Position Supported	Controller
<b>Removable Media</b>			
HP DVD+R/RW 16X Half One standard Height	One	standard	Integrated IDE

Standard Hard Drives

Hot Plug SATA 3.5" Drives

	Quantity Supported	Position Supported	Controller
HP 500GB 1.5G SATA 7.2K	Six	1-6	HP Smart Array E200i/128MB Controller
HP 250GB 1.5G SATA 7.2K			
HP 160GB 1.5G SATA 7.2K			

**NOTE:** HP Systems Insight Manager should not be used to view the status of SATA hard drives and SATA RAID configurations.

Hot Plug SAS 3.5" Drives

	Quantity Supported	Position Supported	Controller
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### Storage

HP 300GB 3G SAS 15K Six

1-6

HP Smart Array E200i/128MB Controller

#### External Storage

	Quantity Supported	Position Supported	Host Controller or Adapter
HP StorageWorks Modular Smart Array 20	Up to 2 per SA 6402; Up to 4 per SA 6404	External	Smart Array 6402 Controller Smart Array 6404 Controller
HP StorageWorks Modular Smart Array 30 Family	Up to 2 per SA 6402; Up to 4 per SA 6404	External	Smart Array 6402 Controller Smart Array 6404 Controller
HP StorageWorks Modular Smart Array 50 Enclosure	Up to 2	External	Smart Array P600 Controller
HP StorageWorks 60 Modular Smart Array	Up to 8 per SA P800	External	Smart Array P800 Controller
HP StorageWorks 70 Modular Smart Array	Up to 8 per SA P800	External	Smart Array P800 Controller
Modular Smart Array 500 G2	1	External	Please see the Modular Smart Array 500 or 500 G2 QuickSpecs for the latest list of supported HBAs: <a href="http://www.hp.com/go/msa500">http://www.hp.com/go/msa500</a> .
Modular Smart Array 1500 cs or 1000	Please see the Modular Smart Array 1500 cs or Modular Smart Array 1000 QuickSpecs links below to determine configuration requirements	External	Please see list of supported HBAs above
Modular Smart Array 1000:	<a href="http://h18000.www1.hp.com/products/quickspecs/11033_div/11033_div.HTML">http://h18000.www1.hp.com/products/quickspecs/11033_div/11033_div.HTML</a> (Worldwide)		
Modular Smart Array 1500 cs:	<a href="http://www.hp.com/go/MSA1500cs">http://www.hp.com/go/MSA1500cs</a>		

#### Tape Drives, Tape Autoloaders, & Tape Libraries

**NOTE:** For an up-to-date listing of the latest O/S Support details for each of the Tape Drives listed below, please see the following:

<http://h18000.www1.hp.com/products/quickspecs/Division/10233.html> (Worldwide)

**NOTE:** For an up-to-date listing of the latest O/S Support details for each of the Tape Autoloaders & Tape Libraries listed below, please see the following: <http://h18000.www1.hp.com/products/quickspecs/Division/10809.html> (Worldwide)

**NOTE:** SAS Tape Drives: Connecting hard drive cage and SAS tape to the same SAS Controller using split cable (supplied with tape drive) deactivates 1 of the hard drive bays. Actual hard drive bay deactivated depends on where split cable plugs into SAS drive connector. Example: 3x SAS cable connector plugged into SAS drive connector (5-8) on the back of the hard drive cage would mean drive bay 8 is deactivated.

**NOTE:** For a list of supported tape drive offerings, see "Add Tape Backup Solution" section above.

Quantity Supported	Position Supported	Controller
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### Storage

<b>HP StorageWorks Tape Drives, USB Internal</b> DAT 24 USB DAT 40 USB DAT 72 USB	1	A-D	Embedded USB 2.0 Port
<b>HP StorageWorks Tape Drives, USB External</b> DAT 24 USB DAT 40 USB DAT 72 USB	1	External	USB 2.0 port
<b>HP StorageWorks Tape Drives, Internal</b> Ultrium 232 Ultrium 460 DAT 40 DAT 72 DLT VS80 DLT VS160 SDLT 320	Up to 2	A-D	64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2
<b>HP StorageWorks Tape Drives, Internal</b> Ultrium 960 SDLT 600	1	A-D	64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2
<b>HP StorageWorks Tape Drives, External</b> Ultrium 232 Ultrium 448 Ultrium 460 DAT 40 DAT 72 DLT VS80 DLT VS160 SDLT 320	Up to 2	External	64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2
<b>HP StorageWorks Tape Drives, External</b> Ultrium 960 SDLT 600	1 per SCSI channel	External	64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2External
<b>HP StorageWorks Rack-mount Tape Drive Enclosures</b> 1U Rack-Mount Kit 3U Rack-Mount Kit 5U Rack-Mount Kit	1 per SCSI channel	External	64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2

Storage

<b>HP StorageWorks Tape Autoloaders, External</b> 1/8 Tape Autoloader	1 autoloader per SCSI channel	External	64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2
<b>HP StorageWorks Tape Libraries</b> MSL2024 (Ultrium 448 and 960-based) MSL4048 (Ultrium 448 and 960-based) MSL6000 (Ultrium 960 and 460-based) MSL6000 (SDLT 600-based)	Please reference the relevant MSL or Tape Library QuickSpecs to determine configuration requirements	External	Please consult the EBS connectivity matrix at <a href="http://www.hp.com/go/ebs">http://www.hp.com/go/ebs</a> for detailed connectivity information.

### Power Specifications

Part Number	380622-001					
Spare Kit	403781-001					
Operational Input Voltage Range (V rms)	90 - 264					
Frequency Range (Nominal) (Hz)	47 - 63 (50 / 60)					
Nominal Input Voltage (Vrms)	<b>100</b>	<b>115</b>	<b>208</b>	<b>220</b>	<b>230</b>	<b>240</b>
Max Rated Output Wattage Rating	725	725	725	725	725	725
Nominal Input Current (A rms)	9.2	7.9	4.2	4.0	3.8	3.6
Max Rated Input Wattage Rating (Watts)	906	895	873	863	863	863
Max. Rated VA (Volt-Amp)	915	904	910	899	909	909
Efficiency (%)	80	81	83	84	84	84
Power Factor	0.99	0.99	0.96	0.96	0.95	0.95
Leakage Current (mA)	0.31	0.36	0.65	0.69	0.72	0.75
Maximum Inrush Current (A peak)	15	17	30	32	34	35
Maximum Inrush Current duration (milliseconds)	3					

#### NOTES:

ActiveAnswers Power Calculation

Power calculator is LIVE on ActiveAnswers Web site. This is an external link.

Follow this link: <http://h30099.www3.hp.com/configurator/powercalcs.asp>

To drill down to calculators:

- Click on: "ProLiant Servers"
- Click on the Server of interest. Example: ML350 G5
- Click on: "Power Calculator" link. (You may need to scroll down to see it)

Technical Specifications

System Unit - Tower	Dimensions (HxWxD) (with feet/bezel)	18.43 x 8.66 x 25.2 in (46.8 x 22 x 64 cm)	
	Weight (approximate)	60 lb (27.24 kg) (without hard drives)	
	Input Requirements (per power supply)	Rated Line Voltage	100-120 VAC / 200-240VAC
		Rated Input Frequency	50 Hz to 60 Hz
		Input Power	<1000W @ 90VAC <1050W @ 115VAC <1205W @ 180VAC
	BTU Rating	Rated Input Current	10A(100VAC),6.7A(200VAC)
			4112BTU/hr 180VAC
	Power Supply Output Power (per power supply)	Rated Steady-State Power	800W at 120V or 1000W at 220V
	Temperature Range	Operating	50° to 95° F (10° to 35° C) (No direct sustaining sunlight)
		Storage (up to one year)	-40° to 158° F (-40° to 70° C)
	Maximum Wet Bulb Temperature	82.4° F (28° C)	
	Relative Humidity (non-condensing)	Operating	10% to 90%
		Non-operating	5% to 90%
	Acoustic Noise	Idle Minimum (Fixed Disk Drives Spinning)	
		L WAd (BELS)	6.0
		L pAm (dBA)	43
Operating Minimum (Random Seeks to Fixed Disks)			
L WAd (BELS)		6.0	
	L pAm (dBA)	43	

### Technical Specifications

<b>Smart Array E200i Controller</b>	<b>Disk Drive and Enclosure Interface</b>	3G SAS (Serial Attached SCSI) 1.5G SATA (Serial Advanced Technology Attachment)
	<b>SAS Connectors</b>	2 internal (SFF8484) x4 wide port connectors
	<b>Cache Memory Speed</b>	DDR1-266 MHz provides up to 4.2 GB/s maximum bandwidth.
	<b>Server Interface</b>	x8 2.5G PCIe provides 2GB/s maximum bandwidth.
	<b>SAS Speed</b>	x8 3G SAS provides 2.4GB/s maximum bandwidth.
	<b>Cache Memory</b>	40-bit 64MB ECC read cache or 40-bit 128MB ECC battery backed, transportable read/write cache
	<b>Logical Volumes Supported</b>	Up to 32 logical volumes
	<b>Maximum Volume Capacity</b>	3 TB (6 x 500 GB)
	<b>Host Memory Addressing</b>	64-bit, supporting greater than 4GB server memory space
	<b>RAID Support</b>	RAID 5 (Distributed Data Guarding) RAID 1+0 (Striping & Mirroring) RAID 0 (Striping)
	<b>Upgradeable Firmware</b>	Upgradeable Firmware
<b>Embedded NC373i Multifunction Gigabit Server Adapter</b>	<b>Network Interface Compatibility</b>	10Base-T/100Base-TX/1000Base-TX IEEE 802.3 10Base-T IEEE 802.3ab 1000Base-T IEEE 802.3u 100Base-TX
	<b>Data Transfer Method</b>	PCI Express, four lanes (x4)
	<b>Network Transfer Rate</b>	10Base-T (Half-Duplex) 10 Mb/s
		10Base-T (Full-Duplex) 20 Mb/s
		100Base-TX (Half-Duplex) 100 Mb/s
		100Base-TX (Full-Duplex) 200 Mb/s
		1000Base-TX (Half and Full-Duplex) 2000Mb/s
	<b>Connector</b>	Two RJ-45
	<b>Cable Support</b>	10Base-T Categories 3, 4 or 5 UTP; up to 328 ft (100 m)
		10/100/1000Base-TX Category 5 UTP; up to 328 ft (100 m)

**NOTE:** The NC373i Multifunction Gigabit Server Adapter requires installation of the Microsoft Windows Server 2003 Scalable Networking Pack (a free download from Microsoft) to enable TCP Chimney offload, Receive-side Scaling (RSS), and Network Direct Memory Access (NetDMA) features.

### *Technical Specifications*

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For hard drives, 1 GB = 1 billion bytes. Actual formatted capacity is less.